Modeling a better burn to boost engine performance

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by David Carrington and Jiajia Waters

In the United States alone, more than 250 million vehicles rely on the tried-and-true internal combustion engine. However, there's always room for improvement, particularly when it comes to better engine performance. With gasoline and diesel becoming more expensive, and alternative fuels still experimental, vehicle manufacturers around the world are investing time and effort studying how to improve these familiar motors.

Engine designers are particularly interested in turbulence – the swirling, violent confusion that results from mixing fuel with gases – when fuel burns. By better understanding and thus better predicting the effects of turbulence on the energy efficiency of an engine, researchers hope to better predict and thus manipulate fluid dynamics to improve engine performance.

To study combustion and help improve engine performance, scientists in the Fluid Dynamics and Solid Mechanics group of the Theoretical division at Los Alamos National Laboratory have developed a new software package known as FEARCE. Short for Fast, Easy, Accurate and Robust Continuum Engineering, FEARCE lets engine designers peer into the violent storm of turbulence inside the engine from the comfort of their desktop computer screen or on a much faster supercomputer.

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